

Appl. No. 10/752,130
Reply to Office action of November 12, 2004

Amendments of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Firstly, please replace original Claims 1, 12 and 15, presently on file, with currently amended Claims 1, 12 and 15.

Secondly, please cancel Claims 8 and 14 presently on file.

Lastly, please include new Claims 21 and 22.

Listing of Claims:

Claim 1 (currently amended) A monolithic optical coupling module comprising:

a light input portion;

a light output portion; and

~~at least one integrally formed light beam attenuator located in an optical path between the light beam input portion and the light beam output portion.~~

further comprising:

a first surface portion and a second surface portion opposite the first surface portion, wherein the first surface portion and the second surface portion define a gap in the monolithic optical coupling module;

a total internal reflection optical turn interface portion that turns a light beam incident on the optical turn interface portion towards the gap.

a third surface portion through which the light beam exits the monolithic optical coupling module; and

a fourth surface portion through which the light beam enters the monolithic optical coupling module,

wherein at least one of the first surface portion, the second surface portion, the optical turn interface portion, the third surface portion and the fourth surface portion comprises an integrally-formed light beam attenuator that attenuates a light beam propagating therethrough to provide an attenuated light beam.

Claim 2 (original) A monolithic optical coupling module according to Claim 1, wherein the light beam output portion comprises an outlet adapted to couple to at least one optical fiber.

Claim 3 (original) A monolithic optical coupling module according to Claim 1, wherein the light beam input portion comprises an inlet adapted to couple to at least one optical fiber.

Claim 4 (original) A monolithic optical coupling module according to Claim 1, wherein the at least one integrally formed light beam attenuator comprises at least one light reflective

portion that is disposed in the optical path to reflect at least some incident light away therefrom.

Claim 5 (original) A monolithic optical coupling module according to Claim 1, wherein the at least one integrally formed light beam attenuator comprises a laser ablated portion.

Claim 6 (original) A monolithic optical coupling module according to Claim 1, wherein the at least one integrally formed light beam attenuator comprises a roughened surface portion that has a predetermined degree of roughness;

wherein during use, the roughened surface portion partially scatters incident light away therefrom to attenuate the incident light by a degree of attenuation corresponding to the predetermined degree of roughness.

Claim 7 (original) A monolithic optical coupling module according to Claim 6, wherein the roughened surface portion comprises a surface having molded surface irregularities;

wherein during use, the molded surface irregularities partially scatter incident light away therefrom.

Claim 8 (cancelled).

Claim 9 (original) A monolithic optical coupling module according to Claim 6, wherein the roughened surface portion comprises one of a sand-blasted, an electro-discharge machined, a turned, a face-milled, a charged particle-etched and a ground surface portion.

Claim 10 (original) A monolithic optical coupling module according to Claim 6, wherein the roughened surface portion comprises a plurality of light reflective portions.

Claim 11 (original) A monolithic optical coupling module according to Claim 10, wherein the plurality of light reflective portions are disposed to form a pattern.

Claim 12 (currently amended) A monolithic optical coupling module comprising:

a first surface portion and a second surface portion opposite the first surface portion, wherein the first surface portion and the second surface portion define a gap in the monolithic optical coupling module; and,

~~wherein at least one of the first surface portion and the second surface portion comprises an integrally-formed light beam attenuator that attenuates a light beam propagating therethrough to provide an attenuated light beam.~~

a total internal reflection optical turn interface portion that turns a light beam incident on the optical turn interface portion towards the gap,

a third surface portion through which the light beam exits the monolithic optical coupling module; and

a fourth surface portion through which the light beam enters the monolithic optical coupling module,

wherein at least one of the first surface portion, the second surface portion, the optical turn interface portion, the third surface portion and the fourth surface portion comprises an integrally-formed light beam attenuator that attenuates a light beam propagating therethrough to provide an attenuated light beam.

Claim 13 (original) A monolithic optical coupling module according to Claim 12, wherein the at least one of the first surface portion and the second surface portion is roughened to a degree of roughness to define the integrally-formed light beam attenuator, the light beam attenuator being able to attenuate the light beam by a level of attenuation corresponding to the degree of roughness.

Claim 14 (cancelled)

Claim 15 (currently amended) A method for forming a monolithic optical coupling module, wherein the monolithic optical coupling module has

a light beam input portion and a light beam output portion,

a first surface portion and a second surface portion opposite the first surface portion, wherein the first surface portion and the second surface portion define a gap in the monolithic optical coupling module,

a total internal reflection optical turn interface portion that turns a light beam incident on the optical turn interface portion towards the gap.

a third surface portion through which the light beam exits the monolithic optical coupling module; and

a fourth surface portion through which the light beam enters the monolithic optical coupling module

wherein at least one of the first surface portion, the second surface portion, the optical turn interface portion, the third surface portion and the fourth surface portion comprises an integrally-formed light beam attenuator that attenuates a light beam propagating therethrough to provide an attenuated light beam.

the method comprising:

integrally forming a light beam attenuator in a light path between the light beam input portion and the light beam output portion.

Claim 16 (original) A method according to Claim 15, wherein integrally forming the light beam attenuator comprises:

providing an input light beam of known intensity to the light beam input portion, the input light beam propagating through the monolithic optical coupling module to exit the module via the light beam output portion as an output light beam;

measuring the intensity of the output light beam to determine an attenuation of the input light beam; and

integrally forming at least one light reflective portion to further attenuate the input light beam to thereby attain a predetermined attenuation relative to the intensity of the input light beam.

Claim 17 (original) A method according to Claim 15, wherein the monolithic optical coupling module is mounted adjacent a light source of an optical coupling assembly, and wherein integrally forming the light beam attenuator comprises:

providing an input light beam from the light source to the light beam input portion, the input light beam propagating through the monolithic optical coupling module to exit the module via the light beam output portion as an output light beam;

measuring the intensity of the output light beam; and
integrally forming at least one light reflective portion to attenuate the input light beam to have the measured intensity of the output light beam at a predetermined level.

Claim 18 (original) A method according to Claim 15, wherein integrally forming the light beam attenuator comprises laser ablating an internal portion of the monolithic optical coupling module.

Claim 19 (original) A method according to Claim 15, wherein integrally forming the light beam attenuator comprises roughening a surface of the monolithic optical coupling module.

Claim 20 (original) A method according to Claim 19, wherein roughening a surface comprises one of sand-blasting, electro-discharge machining, turning, face-milling, charged particle etching and grinding the surface.

Claim 21 (new) A monolithic optical coupling module according to Claim 12 wherein at least one of the optical turn interface portion, the third surface portion and the fourth surface portion comprises a second integrally-formed light beam attenuator that attenuates a light beam propagating therethrough to provide an attenuated light beam.

Claim 22 (new) A monolithic optical coupling module according to Claim 12 wherein at least one of the optical turn interface portion, the third surface portion and the fourth surface portion is roughened to a degree of roughness to define the integrally-formed light beam attenuator, the light beam attenuator being able to attenuate the light beam by a level of attenuation corresponding to the degree of roughness.